

*Salvadora persica* or the toothbrush tree is a small evergreen tree native to the Middle East, Africa and India.<sup>[1]</sup> Its sticks are traditionally used as a natural toothbrush called [\*miswak\*](#) and are mentioned by the World Health Organization for oral hygiene use.<sup>[1][2]</sup>

|                  |               |
|------------------|---------------|
| <b>Kingdom:</b>  | Plantae       |
| <b>Clade :</b>   | Tracheophyte  |
| <b>Clade _:</b>  | Angiosperms   |
| <b>Clade :</b>   | Eudicots      |
| <b>Clade :</b>   | Rosids        |
| <b>Order :</b>   | Brassicales   |
| <b>Family :</b>  | Salvadoraceae |
| <b>Genus :</b>   | Salvadora     |
| <b>Species :</b> | S. persica    |

### **Miswak contains active ingredients and its biological effect**

- Resins - safeguard teeth from dental cavities by creating a protective coating around the enamel [1]
- Silica - combats plaque and contributes to teeth whitening [2]
- Alkaloids - exert antibacterial and antifungal properties on dental health. [3]
- The antibacterial properties of sulfur serve to safeguard the teeth from bacterial infections.[4]
- Vitamin C serves to facilitate tissue regeneration and inhibit damage [5]
- Calcium contributes to the mineralization of the enamel [6]
- Fluoride and chloride are essential for mineralization and play a crucial role in maintaining dental hygiene [7]
- Tannic Acid or Tannins promotes the reduction of plaque and gingivitis formation.
- Sodium bicarbonate is a nature-based teeth whitener. [8]
- Essential oils confer a refreshing scent that effectively prevents bad breath and promotes saliva production. [9]
- Exert antidiabetic properties and lower cholesterol levels. [10]
- The inhibitory properties of BITC, a chemical extracted from the root of *Salvadora persica*, against herpes simplex virus-1 (HSV-1) were examined [12]
- Darmani et al discovered that the water-based extracts of miswak and derum (Walnut tree; *Juglans regia*) exhibit substantial inhibitory effects on the proliferation of cariogenic bacteria.[13]

### **Anticancer properties, Act as**

- Cyclotrisiloxane, hexamethyl-( Anti cancer properties), [14]
- Fluoride 10 (Anticariogenic activity and tooth remineralization) [15]
- Flavonoids 92 (Has cytotoxic activity) [16]
- Benzyl isothiocyanate 95 (Act as chemo-preventive agents, Has bactericidal activity, Has virucidal function) [17]
- L.N-benzyl-2-phenylacetamide<sup>37</sup>(Act as a chemo preventive agents)(

### **How to natural Miswak prevent Cancer?**

Antioxidants are essential compounds that have the capacity to safeguard the organism against harm caused by oxidative stress created by free radicals.<sup>71</sup> Antioxidants, whether exogenous or endogenous, and synthetic or natural, are all efficient in inhibiting the generation of free radicals by either scavenging them or facilitating their breakdown, hence mitigating related diseases.<sup>72</sup> Little research has documented the antioxidant properties of Miswak (*Salvadora persica*). [19,20,21]

- Preventing inflammation [benzyl isothiocyanate]
- Inhibiting Proliferation of cancer cell
- Preventing DNA damaging[isothiocyanate]
- Cell cycle arrest
- P53 activation( inhibit cancer cell division)

### **Anti-cancer ingredients of Miswak**

The presence of recognized anticancer agents such as eicosane, psis-carotene, 3',4'-didehydro-1',2'-dihydro-1',2'-dihydroxy-(2'R)-9,12,15-octadecatrienoic acid, 2,3-bis[(trimethylsilyl) oxy]propyl ester, and formyl

colchicine in an ethanol extract of SP fruit was detected using GC-MS analysis [22]

### **WHO statement about Miswak**

The World Health Organisation promotes the use of chewing sticks due to its potential contribution to the overall improvement of oral health.[23]

### **Microplastic may cause cancer**

Indications of the possible health hazards linked to microplastics, especially those found in plastic toothbrushes, are increasing. Microplastics have the ability to release toxic substances such as bisphenol A (BPA) and phthalates, which are disruptors of the endocrine system and have been associated with cancer. Upon degradation, plastic toothbrushes have the potential to emit microplastics, which can then enter the body by means of ingestion, inhalation, or absorption.

Furthermore, microplastics find application in the production of soap, shampoo, toothpaste, moisturizers, sunscreen lotions, face masks, eye shadows, lipsticks, and children bubble baths. [24]

### **Excessive use of fluoride in toothpaste can lead to several side effects, including:**

- Dental Fluorosis: An excessive amount of fluoride exposure in youngsters with developing teeth can result in the formation of white or brown spots on the teeth. [25]
- Skeletal Fluorosis: Prolonged exposure to elevated fluoride concentrations can cause bone weakening, resulting in discomfort and stiffness of the joints. [26]

- Gastrointestinal Consequences: Consuming excessive quantities of fluoride can lead to symptoms such as nausea, vomiting, and stomach discomfort [27]
- Neurological Effects\*: Some research indicate that high fluoride consumption may impact brain development, although this phenomenon is still a subject of discussion.[28]

### **Here are some benefits of using \*Miswak\* over conventional toothpaste and toothbrush**

- Natural Antibacterial Properties\*: Miswak possesses inherent antibacterial characteristics that combat oral germs.[29,30]
- No Requirement for Supplementary Chemicals\*: It effectively eliminates the need for toothpaste, therefore preventing contact with artificial chemicals and fluoride.
- Whitening and Freshening Effects\*: Miswak has inherent properties that aid in the enhancement of tooth whiteness and breath freshness.18 references: [31,32,33]
- Ecologically Sustainable\*: Unlike plastic toothbrushes, it is biodegradable, so minimising its environmental footprint.
- Enhances Gum Health\*: Miswak possesses anti-inflammatory characteristics that facilitate the maintenance of healthy gums and reduction of plaque. Furthermore, some research have asserted that miswak possesses antioxidant, analgesic, and anti-inflammatory properties.: [34,35]

### **Using miswak is superior than toothpaste and toothbrush**

- This investigation demonstrated the inherent advantageous impact of miswak extract in the practice of oral hygiene as compared to toothpaste (36).

- The results of both experimental and clinical studies indicated that miswak was equally effective as a toothbrush in eliminating plaque on the surfaces of buccal teeth(3).
- Certain studies suggest that using \*natural Miswak\* offers distinct benefits compared to a toothbrush and toothpaste, particularly in terms of its chemical-free nature, eco-friendliness, and inherent antibacterial properties. The substance comprises bioactive constituents that enhance oral health, combat bacteria, and maintain gum health. Nevertheless, toothbrushes and toothpaste are specifically formulated to efficiently cover all regions of the mouth and frequently include fluoride to further prevent dental caries.<sup>38</sup>

### **The Problem With Plastic Toothbrush**

Plastic toothbrushes are non-recyclable,

Resistant to biodegradation, and

Environmentally detrimental.

Increased use of plastic for the packing of toothbrushes

### **Fluoride side effect**

- Excessive accumulation of fluoride in the body has been demonstrated to have detrimental effects on bodily tissues, including the neurological system, even in the absence of prior physical abnormalities. [39]
- Fluorosis is a considerable worldwide public health issue. Sustained exposure to high levels of fluoride leads to the buildup of fluoride in the hippocampus, which in turn causes cognitive impairment. [40]

- These results suggest that even at lower levels, exposure to fluoride can worsen the impairment in learning and memory as well as neuropathological injury.[41]

### **Beneficial effects other parts of Miswak tree**

Furthermore, it is employed for the purpose of alleviating boils, chest ailments, gonorrhea, headache, spleen infections, stomachache, and ulcers. Furthermore, the root infusion can be employed to enhance lactation in women. The leaves of the plant are widely used as a mouthwash and for the treatment of many ailments such as chest pain, cough, dental and periodontal issues, bodily pain, backache, piles, stomachache, stomatitis, and wounds. Latex derived from bark is advantageous for the healing of skin ulcers. The seeds are consumed as a tonic, and the oil extracted from the seeds is used to alleviate joint pain, neck stiffness, and rheumatism. Furthermore, it has been employed to alleviate edema, fever, malaria, and worm invasion. [42]

### **Miswak and covid 19**

- ✓ Using Miswak effective method to prevent covid 19 infection [43]

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